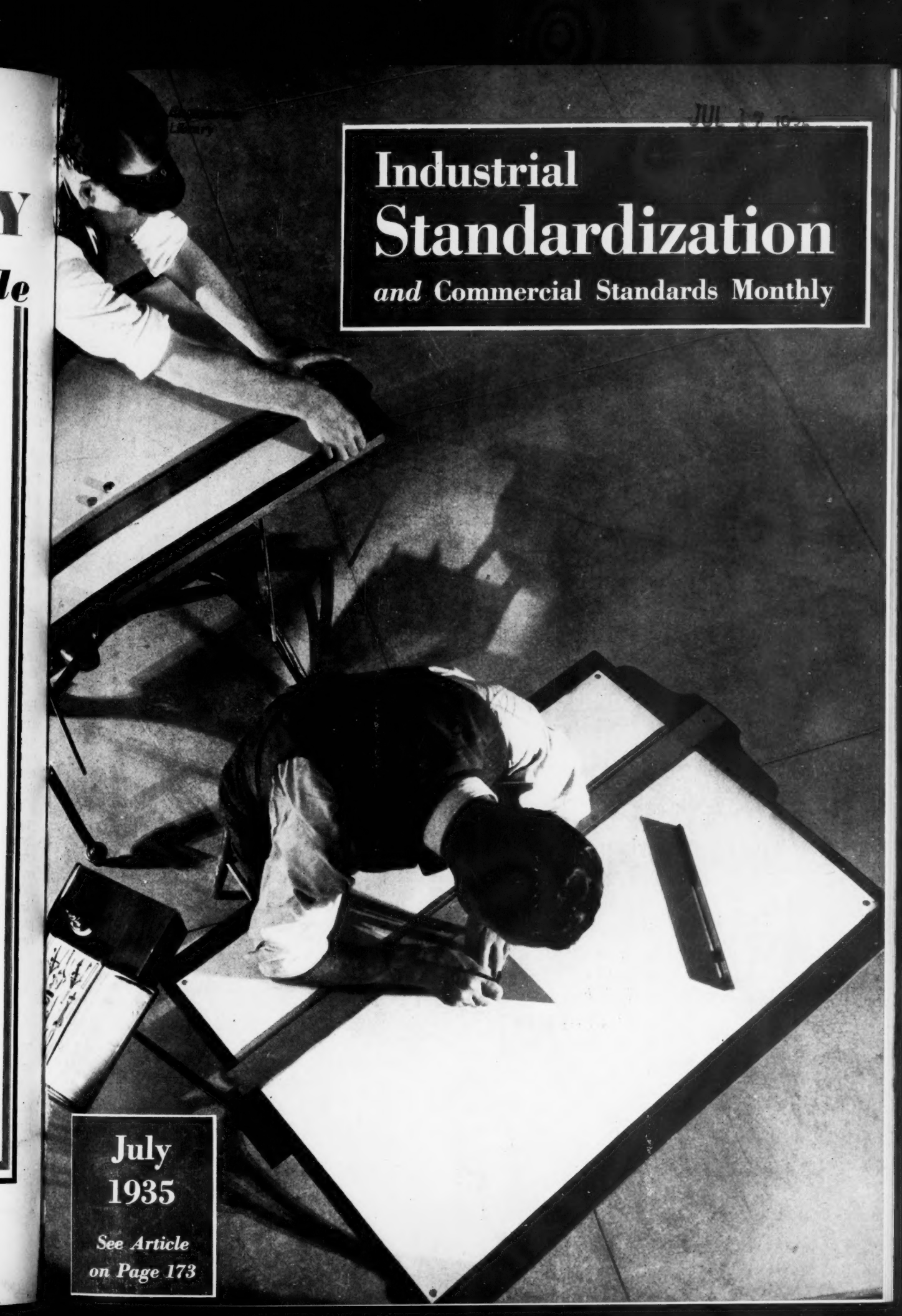

Industrial Standardization

and Commercial Standards Monthly

July 1935

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JULY 1935

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Standard for Industrial Drawings Is Given National Approval by ASA

by
Franklin DeR. Furman[1]

Chairman, ASA Sectional Committee on Drawings and Drafting Room Practice

Differences in methods of representing details in industrial drawings, now widespread, frequently result in confusion and misunderstanding

ASA committee recommends use of national drawing standards to insure mutual understanding, thus saving time in making drawings, eliminating needless explanatory correspondence and preventing costly mistakes

THE difficulty of adopting standards for drawings was sensed, basically, by the writer of an extended article on Drawing in an early edition of *The Encyclopedia Brittanica*. He said, "Drawing always begins with a line and there are no lines in nature. The natural world presents itself to the eye as an assemblage. . . . The conventionalism of the line being once admitted, it may be considered as neither good nor bad in itself, but a simple necessity."

The differentiating characteristics of Holbein, of Raphael who openly declared that he drew men and women, not as they were, but as they ought to be, of da Vinci and Michelangelo, are a broad parallel to the situation that has long existed in the field of mechanical and engineering drawing.

There have been masters, too, in mechanical and engineering drawing and my revered professor and predecessor, Dr. Charles W. MacCord, was one of them. In a series of articles in *Scientific American Supplement*, begun January 1, 1876, he said:

"We select, as the first subject, an illustration of the detail drawing of a bolt and nut—fastenings are important parts of every mechanism, and *it is well to settle at the outset on the best mode of representing them.*"

What Is Best?

Just what is "best mode" constitutes practically the whole subject of standardization of drawings and drafting room practice, and Professor MacCord's comment in 1876 typifies the problem involved in presenting a report on drawing standards today.

Referring to his first illustration of the bolt and nut, Professor MacCord said:

"We should strictly draw a helix, but the curvature is so slight that we may draw a right line instead. . . . The former (the right line representing the *crest* of the threads) should be drawn heavier than the latter (the root lines of the thread) because the crest lines cast the shadows."

Later in the article Professor MacCord calls attention to other *common* methods of representing the screw thread in which the root lines instead of the crest lines are made heavy, and he adds, "We have heard it gravely argued that this is right because they (the root threads) *are in the shadow*," to which he naively suggests, "Very true, but how did they come to be in the shadow?"

Differences of opinion concerning methods of representing details of objects by lines and dimensions, of which the above is typical, have multiplied a hundred fold, even including the size of the paper on which the drawings are made. And to make it all worse, these various methods and

[1]Dean, Stevens Institute of Technology, Hoboken, N. J.

practices have become so deep-rooted in small industries, and in very large and super-industries, that sentiment, pride, and finance all play a very serious part in delaying the day when drawing shall become ideal in facility of expression at home, in exact interpretation abroad, and as a means of preventing wasteful and often costly misunderstandings in manufacture and production everywhere.

In the light of present-day scientific and engineering development, it is most obvious that something should be done on a national scale toward achieving a practical ideal in drawing methods and drafting-room practices. The economic phase of the subject alone is sufficient to warrant whole-hearted cooperation by American industry. Many competing manufacturing countries already have drawing standards and practices nationalized to insure a mutual understanding, which saves time in making drawings, time in correspondence explaining them, time and cost in correcting errors *when they can be corrected*, and perhaps more important than all, from a human as well as financial standpoint, helps to establish the *entente cordiale* in industry that is always an aid to economic production.

Early Drawing Standards

Before the institution of the American Standards Association (originally organized as the American Engineering Standards Committee in 1918), there were standardization developments in drawing, notably by the U. S. Navy in setting forth drawing standards and practices for their own use, and by the American Society of Mechanical Engineers, in 1914, in the development of cross-section standards. This latter work was done under the direction of a special committee of which the late H. deB. Parsons was chairman, and the writer a member. The standard proposed and later adopted consisted chiefly in a reduction in number of the numerous and fantastic schemes of cross-hatching that were coming into vogue, and a simplification of line work by eliminating heavy lines. Since that time, a number of individuals, notably teachers of mechanical and engineering drawing who recognized the importance of a fuller set of standards and conventions, have undertaken a broad canvass of manufacturing and industrial concerns with the purpose of codifying the results and establishing the most useful and practical methods for their students and others who might care to use them. Among these individuals are Calvin C. Bishop (1922), Professor Frederick W. Ming (1923), H. D. Campbell (1924), Professor H. B. Langille, and Professor Thomas E. French. The work of all of these men contributed greatly to the efforts of the present committee, forming as it did a background, a guide, and a yardstick in interpreting the results of the committee's later canvass.

The matter of a formal national standardization for drawings and drafting room practice was laid before the A.S.M.E. Standardization Committee in 1925. Such standardization was recommended by the Committee to the A.S.M.E. Council, the Council approving and in turn requesting the American Standards Association "to authorize the organization of a nationally representative committee under its procedure to develop standards for drawings and drafting-room practice." The ASA Standards Council gave its approval at its meeting in December, 1925, outlined the scope of the work, and designated The Society for the Promotion of Engineering Education and the American Society of Mechanical Engineers as joint sponsors.

47 Organizations Invited

Invitations were sent to 47 organizations to appoint official representatives to meet at the rooms of the A.S.M.E. in New York City, September 24, 1926. At this meeting the present committee, known as the Sectional Committee (of the ASA) was formed. Franklin DeR. Furman was selected to act as chairman and Carl W. Keuffel as secretary. At that same meeting, and subsequently, six subcommittees were formed, as follows, to undertake the formulation of tentative drafts of the several sections covering the scope of the sectional committee's work:

Subcommittee 1: Specifications for Paper and Cloth. A. A. Coburn, Washington, D. C., Chairman.

Subcommittee 2: Methods of Indicating Dimensions. Edmund B. Neil, Detroit, Mich., Chairman.

Subcommittee 3: Lettering. Thomas G. Crawford, General Electric Company, Schenectady, N. Y., Chairman.

Subcommittee 4: Drawing Layout. Fred G. Wolff, American Car and Foundry Company, New York, Chairman.

Subcommittee 5: Line Work. Samuel Ketchum, Treadwell Company, Inc., New York, Chairman.

Subcommittee 6: Graphical Symbols for Drawings. G. H. Drake, succeeded by Prof. Thomas E. French, Ohio State University, Columbus, Ohio, Chairman.

Questioned 900

Each of these subcommittees gathered data through questionnaires, with the cooperation of the S.P.E.E. Division on Engineering Drawing. Over 900 organizations interested in engineering

Drawing Committee Represents Industrial, Educational Groups

Standard arrangement of views, line work, dimensioning, sheet sizes, and lettering have been agreed upon by this widely representative committee as representing the most generally accepted drawing practice. Their decision followed extensive inquiries throughout industry and in school circles, and was the result of decisions reached following the return of many questionnaires.

The members of the committee are:

Franklin DeR. Furman*, Society for the Promotion of Engineering Education, *Chairman

Carl W. Keuffel*, Manufacturers' Group, *Secretary

American Society of Mechanical Engineers, *Sponsor, Samuel Ketchum, John K. Olsen, Edward S. Smith, Jr.*
Society for Promotion of Egineering Education, *Sponsor, R. G. Alexander, Clarence E. Coolidge, Thomas E. French, Franklin DeR. Furman, F. G. Higbee, Walter H. James, Harvey H. Jordan, Rudolph Michel (Alt.), Herbert B. Langville, Harry M. McCully, Frederick W. Ming, Clarence E. Townsend*
American Foundrymen's Association, *E. F. Cone*
American Gas Association, *W. L. MacIntosh*
American Institute of Architects, *F. Leo Smith*
American Institute of Consulting Engineers
American Institute of Electrical Engineers, *Thomas G. Crawford*
American Marine Standards Committee
American Society of Civil Engineers, *R. S. Patton*
American Society of Heating and Ventilating Engineers, *David S. Boyden*
American Society of Refrigerating Engineers, *Louis H. Roller, S. P. Melville*
American Transit Association, *C. W. Burke*
American Welding Society, *James W. Owens*
Association of American Railroads—Engineering Division—Construction and Maintenance Section—Records and Accounts Committee, *D. L. Avery*
Association of Edison Illuminating Companies
Edison Electric Institute, *Alfred Iddles, Alexander Maxwell (Alt.)*
Heating, Piping, and Air Conditioning Contractors National Association, *George P. Nachman, Lewis S. Land, (Alt.)*
Illuminating Engineering Society, *Ward Harrison, Joseph J. McLaughlin (Alt.)*
Institute of Radio Engineers, *Laurens E. Whittemore*
Manufacturers' Group, *F. R. Allin, Carl K. Keuffel*
Manufacturers Standardization Society of the Valve and Fittings Industry, *Arthur M. Houser*
National Association of Master Plumbers of the U.S., *Jere L. Murphy*
National Electrical Manufacturers Association, *Ward B. Cart*
Society of Automotive Engineers, *Maximillan C. Frins, C. F. Drum (Alt.)*
Society of Naval Architects and Marine Engineers
Telephone Group, *W. L. Heard, A. K. Leupold*
Trade and High School Group, *Douglas Baker, H. D. Campbell, Leon Friend, Arthur C. Harper, Frank R. Laney, Frank C. Panuska, Carl Rossmassler*
U. S. Department of Agriculture, Bureau of Public Roads, *E. W. James*
U. S. Independent Telephone Association, *A. L. Stadermann*
U. S. Navy Department, *Howard C. Fletcher*
U. S. War Department, *A. A. Coburn*
Members-at-large, *E. R. Harris, Edmund B. Neil*

drawings were invited to respond. In addition, the reports of several of the national standardizing bodies of foreign countries were carefully scrutinized. Results so obtained were codified and presented to the sectional committee, and in some instances revised questionnaires were again sent out.

During the spring of 1931, an editing committee consisting of the chairmen of the six subcommittees, with Thomas E. French as chairman, undertook to combine and harmonize the final reports of the several subcommittees.

The editing committee's report was in turn reviewed by a number of members of the sectional committee and several questions still in doubt were discussed in detail at a meeting of the sectional committee held on December 5, 1933.

The standard thus arrived at was printed in proof form and sent to the 52 members then constituting the sectional committee, for final review and vote on approval by letter ballot. This vote was completed in December, 1934, with 50 members voting approval, 2 members non-approval.

The report of this vote, together with copies of the report, were then approved by the sponsor societies, The Society for the Promotion of Engineering Education and the American Society of Mechanical Engineers, and these approvals forwarded to the American Standards Association, which gave its final approval on May 29, 1935.

Copies of the American Standard Drawings and Drafting Room Practice now are available from the sponsor organizations or from the American Standards Association, at 50 cents each. Members of the American Standards Association are entitled to 20 per cent discount when ordering approved American Standards from the ASA office.

Quantity prices are also available on orders of 100 copies and more.

Committee Urges Acceptance Of Uniform Drawing Practice

In providing a code of standard practice for drafting in the United States, the American Standards Association is attempting to fill a long-standing need. Heretofore a lack of uniformity in practice has existed. Most of the larger drafting rooms have devised their own standard practices, and graphical symbols in unnecessary variety have been developed. Drawing has often been called "the graphic language," "the language of industry," etc. So, as a language, it should have a recognized and authoritative "dictionary" in order that it may be written and read with invariable accuracy.

In general this standard follows the prevailing present practice as indicated by majority votes on the questionnaires and approvals of preliminary reports. Consequently, the standard is not a wide deviation from accepted practice.

It is not always safe to say that the most used is the best practice but whenever a definite majority prefers one method and the balance is made up of many small minorities it may generally be assumed that the best practice is that of the majority. When two or more methods have nearly the same number of followers, the one coming into increasing use by progressive firms has been given preference over one declining in use.

Each of the variations referred to has its advocates and it is recognized that a good many will be reluctant to change from some method they may be using to another which to them seems to be no better, but it is hoped that in the interest of uniformity the adopted standard method of representation may be accepted by them in spite of individual preference. Only by such concessions can a standard practice become a reality.—*Abstract from Preface, American Standard Drawings and Drafting Room Practice.*

Specifications for Sand Prepared for Navy Foundry

The National Bureau of Standards has recently formulated purchase specifications for 12 grades of foundry sands which are used in molding practice in the foundry of the United States Navy Yard, Naval Gun Factory, Washington, D. C.

These specifications are based largely upon the physical properties as determined by laboratory studies on the grades of molding materials in use in the foundry of the Naval Gun Factory. The sand and clay contents of each grade are controlled by grain fineness number, grain fineness class, clay content per cent and class, grain distribution, and grain shape. The limits for variation in physical properties also include moisture content, permeability, compressive and tensile strengths, surface hardness, and sintering point. Each specification indicates methods for sampling the sands and describes briefly suitable methods for testing.

The use of specifications to insure uniformity in the supplies of foundry sands should bring about the possible standardization of molding practice and general improvement in castings.

Motor Truck Association Is New Member of ASA

The Motor Truck Association of America recently affiliated with the American Standards Association as an Associate Member.

The membership of this association includes many owners of large fleets, both owner-operated and for hire, in this country. More than 110,000 trucks are operated by its members.

The Motor Truck Association functions on behalf of the trucking industry in its efforts to secure just and reasonable legislation. It is also active in developing and promoting highway safety.

Australian Association Approves Cement Standard

A new Australian Standard outlining Methods for the Determination of Consistency of Cement Concrete (slump test) and for Making and Storing Specimens of Cement Concrete for Compression Test, approved by the Standards Association of Australia, has been received by the American Standards Association Library. Copies can be borrowed or ordered through the ASA office.

ASA Committee Sets National Standards For Braid Used in Insulating Wires, Cables

by
G. W. Zink[1]

Habirshaw Cable & Wire Corp., Yonkers, N. Y.

Uniform standards to guide manufacturers and consumers in selecting quality braid for insulating electric wires and cables have been agreed upon by a nationally representative committee sponsored by the Electrical Standards Committee

THE subject of braided coverings in the insulated wire and cable industry has always been a problem to both the manufacturer and the consumer, largely because of diversified manufacturing equipment and the fact that personal judgment as to what constituted acceptable quality made a purely mathematical solution appear impossible.

Numerous specifications have been in use which stipulate braid constructions in more or less detail and most manufacturers have had factory standards which were followed where customer specifications did not give detailed requirements. There has been no uniformity in these various constructions and the result was that cables of the same size and for the same service might be furnished with quite different coverings. Such a situation is inconvenient for all concerned. Consumers must have individual specifications, to insure receiving a uniform product, and manufacturers are required to carry stocks of a large number of yarn sizes in order to meet the requirements of these various specifications.

Assures Uniform Product

The braid specifications recently adopted by the American Standards Association will do much to clear up this situation. The manufacturer will have a standard flexible enough to permit the use of any standard braiding equipment with a minimum number of cotton sizes and the consumer will be able to obtain a uniform product in classes suitable for any usual service.

Before considering the problems encountered in developing the present braid formula and the method of arriving at certain constants used in the formula, it should be understood that fancy braids of glazed cotton and rayon, such as are used on lamp cords, will not be considered. The characteristics of such braids are determined largely by appearance, whereas braids on insulated conductors used for general wiring are primarily to protect the insulation from mechanical injury during installation and handling and from the action of the elements after installation.

It is obvious that large-size wires require more mechanical protection than small sizes; therefore, braid thicknesses are increased as the diameter to be covered increases. Likewise, conductors installed in underground ducts or in exposed locations require more protection than where installed in conduit in buildings and this accounts for having two general classes, designated as "standard" and "heavy." The thickness of the braid is, of course, determined by the size of cotton used, but inasmuch as cotton is not a rigid material, the problem is not as simple as it first appears.

In published yarn tables, the diameter of single-ply yarn is determined by the formula

$$t = \frac{0.0279}{\sqrt{S}}$$

Where S = the ply size or number.

If cotton yarns were similar to a hard wire, two ends twisted or plied would be twice the diameter of single end and three-ply would be 2.16 times the single-ply diameter. Actually, this relation does not hold, particularly for soft yarns, and in

[1]Member of subcommittee 4 on Rubber Insulation, and subcommittee 8 on Fibrous Coverings of the Sectional Committee on Insulated Wires and Cables.

Representatives of Many Interests Worked on Braid Standard

Following its preparation by a technical subcommittee, the proposed standard for braid used in insulating wires and cables was approved by the sectional committee and by the Electrical Standards Committee, which is in charge of all electrical work of the American Standards Association, and was submitted to the American Standards Association for final approval.

The sectional committee, which is representative of all interests connected with insulated wires and cables, has the following membership:

F. M. Farmer*, American Society for Testing Materials, *Chairman
G. M. Haskell*, National Electrical Manufacturers Association, *Vice-Chairman
W. F. Davidson*, Electric Light and Power Group, *Secretary

American Institute of Electrical Engineers, *W. A. Del Mar, E. B. Meyer, J. B. Whitehead*
American Society for Testing Materials, *W. H. Bassett, F. Malcolm Farmer, C. B. Martin*
American Transit Association, *C. R. Harte, F. J. White*
Association of American Railroads-Engineering Division-Electrical Section, *C. B. Martin*
Association of American Railroads-Engineering Division-Signal Section, *J. J. Corcoran*
Association of Railway Electrical Engineers, *J. R. Sloan*
Bell Telephone System, *C. S. Gordon*
Electric Light and Power Group, *R. N. Conwell, W. F. Davidson, D. W. Roper, A. B. Campbell (Alt.)*
International Association of Municipal Electricians, *Stanton S. Hertz, Dr. M. G. Lloyd (Alt.)*
National Board of Fire Underwriters, *A. H. Nuckolls*
National Electrical Manufacturers Association, *W. H. Bassett, G. M. Haskell, C. O. Hull, Moss A. Kent, E. D. Youmans*
National Fire Protection Association, *R. B. Shepard*
Society of Automotive Engineers, *F. W. Andrew, W. S. Haggott*
U. S. Department of Commerce, National Bureau of Standards, *Dr. J. Franklin Meyer*
U. S. Navy Department, Bureau of Engineering, *Officer in Charge, Laboratory Officer (Alt.)*
U. S. War Department, *Lieut. Col. John W. N. Schulz*
Members-at-Large, *Dean Harvey, Philip Torchio*

order to make the formula workable, a cabling factor is introduced. This was arrived at by winding various sizes and plies of commercial soft yarns on rods, using a uniform tension. The build-up was measured and workable constants arrived at which were also checked by actual braided samples.

These constants are admittedly subject to some variation and cannot be made exact for all conditions, due to non-uniform twisting and in braider tensions being variable. In actual practice they will, however, insure meeting the minimum braid thicknesses specified.

Covering Power Is Problem

The function that a braid performs after installation in protecting the insulation from sunlight, moisture, or other elements which have a deteriorating effect upon it depends upon the closeness of weave, ability to retain saturating and coating materials, and ability to permit bending of the finished cable without destroying the effectiveness of the covering. The use of soft cotton yarn and proper weave will take care of the saturating and coating, and limiting the angle of application of the yarn will readily take care of the bending. The real problem, then, becomes one of determining the degree of closeness or covering power.

It is possible to derive several equations for determining the area covered by a given braid or for the number of strands or picks per inch, and, although mathematically correct, they are not practical to use unless modified by including certain more or less arbitrary constants. The closeness of a braid may be considered as related to the area covered or to the space between adjacent strands. The per cent area covered is perhaps the simplest method of specifying closeness but, unfortunately, is not entirely satisfactory. A braid having two ends of cotton per braider carrier may cover the same per cent of the total surface of a given wire as one having four ends per carrier, but the actual area of the exposed surface in the interstices of the crossing strands will be quite different in each case. Inasmuch as the exposed area in any one spot, rather than the sum of these areas as related to the total area, is what determines a satisfactory covering, the two-end braid could be used safely and the four-end one might be quite unsuitable, even though the total coverage is the same in both cases.

It has been found more practical to use the distance between adjacent strands to govern the degree of closeness of a braided covering and the present braid standards are based on the following equation:

$$\text{Picks per inch} = \sqrt{\left(\frac{1}{tE + M}\right)^2 \left(\frac{c}{2\pi\ (D + T)}\right)^2}$$

in which the value M is the actual distance be-

tween carrier strands expressed as a function of the width of such strand.

The manner in which M is determined may need some explanation beyond that given in the published standards. In the original development of the equation, several possible methods of determining this value were tried, such as simple percentage, a fixed spacing, or a fixed ratio of area covered. Actual braided samples, however, proved all these methods unsatisfactory if applied universally to all types of braiders and sizes of yarns. It became evident in studying the problem that the judgment of experienced persons was quite consistent in selecting braids of satisfactory quality. Therefore, an effort was made to evaluate this in some way. Several hundred samples of wire, ranging in sizes up to three inches in diameter, were braided on several types of machines, with numerous constructions, and these samples were examined by a number of persons. The acceptable samples were calculated for space between strands and the various values plotted. When it was found that a well-defined and regular curve was indicated, an equation in terms of the width of strand was developed, which gave a curve of substantially the same shape as the experimental curve. This equation is used in determining the values of M.

It might be noted that the present equation for picks per inch can be used for determining braids of any degree of closeness by applying various constants in connection with the equation used in determining the space between strands.

—•—

A.S.T.M. Awards 1935 Charles B. Dudley Medal

C. A. Hogentogler, Senior Highway Engineer, and E. A. Willis, Assistant Highway Engineer, U. S. Bureau of Public Roads, have been chosen as the winners of the Charles B. Dudley Medal for 1935 by the American Society for Testing Materials. This medal is awarded annually by the A.S.T.M. to the author or authors of the paper presented at the preceding annual meeting which is of outstanding merit and constitutes an original contribution to research in engineering materials.

The winning paper presented in 1934 was "Subgrade Soil Testing Methods." The authors evaluated methods for determining properties of subgrade soils, indicating the principles to be followed in the conduct of the tests and interpretation of results.

The medal was formally awarded to the joint authors at the annual A.S.T.M. dinner, June 26, during the Thirty-eighth Annual Meeting of the Society in Detroit.

Committee Suggests Standards for Cotton

Specifications for cotton used in making braid for insulating purposes do not come within the scope of the sectional committee on Insulated Wires and Cables, the technical committee in charge of the standard Specifications for Cotton Braid for Insulated Wires and Cables said. The committee suggested that specifications for the cotton might well be worked out by A.S.T.M. Committee D-13 on Textile Materials.

The U. S. Government bulletins describe 32 grades of cotton in seven colors, and market reports list 15 or more grades which are being traded in. The latter show large variation in the cost of cotton, depending on the color and length of the staple.

The main purpose of the present standard specifications, the committee pointed out, is to secure uniformity among manufacturers.

Mr. Hogentogler represents the American Society for Testing Materials on the sectional committee on Methods of Testing Road and Paving Materials, working under the procedure of the American Standards Association.

—•—

Transit Association Proposes Packaging Simplification

The American Transit Association has requested the cooperation of the Division of Simplified Practice, National Bureau of Standards, in establishing Simplified Practice Recommendations for the methods used in packaging items purchased from manufacturers for the use of electric railways.

Since 1931, when the American Transit Association (then the American Electric Railway Association) commenced its broad program of simplification in the field of packaging, the following Simplified Practice Recommendations have been promulgated:

R65-31, Packaging of Overhead Electric Railway Materials

R145-33, Packaging of Electric Railway Motors and Controller Parts

Falvey and Prentis Are New Members of ASA Board

WALLACE J. FALVEY, vice-president, Massachusetts Bonding & Insurance Company, and Edmund A. Prentis, of the firm of Spencer, White, and Prentis, Inc., New York engineers, have been elected to the Board of Directors of the American Standards Association.

Mr. Falvey, who heads the New York office of the Massachusetts company, was nominated by the National Bureau of Casualty and Surety Underwriters, and will serve until 1937.

Mr. Prentis will also serve for two years. He was nominated by the American Society of Civil Engineers.

Mr. Falvey has been in the insurance business ever since his graduation from college. For the past three years his company has been a member of the Executive Committee of the National Bureau of Casualty and Surety Underwriters and Mr. Falvey has been its representative on the Committee. He is also a member of the Industrial Hygiene Committee of the New York Tuberculosis and Health Association, representing the National Bureau of Casualty and Surety Underwriters.

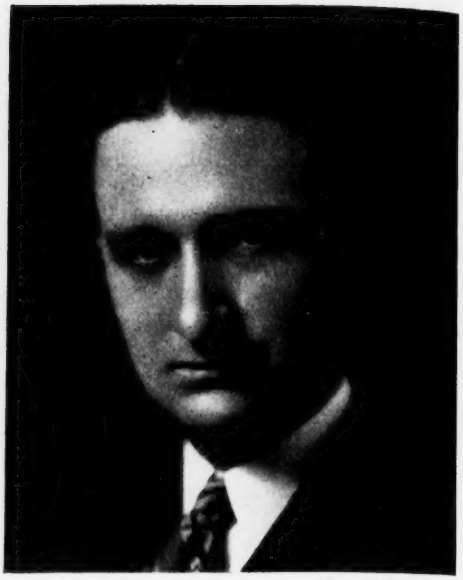

Photo by Blank-Stoller

Wallace J. Falvey

Edmund A. Prentis

Blackstone Studios

Mr. Prentis is a member of the firm of Spencer, White, and Prentis, consulting engineers, widely known for their work on foundations of buildings. Mr. Prentis is vice-president and one of the organizers of the Engineering Construction Company, which is building two of the large dams across the Mississippi River. He is also vice-president of the Hyman and Goodman Company, New York subway builders, and of the Cajabamba Mine and Milling Company of Peru.

Mr. Prentis is co-author of "Underpinnings," published by the Columbia University Press.

Parker and Small Re-Elected

J. C. Parker, president, Brooklyn Edison Company, nominated by the Electric Light & Power Group, and A. R. Small, president, Underwriters' Laboratories, nominated by the Fire Protection Group, were re-elected as members of the ASA Board of Directors for a two-year term.

The other members of the Board are:

Howard Coonley, president, Walworth Company, New York, nominated by the American Society of Mechanical Engineers, *President*

Dana D. Barnum, president, Boston Consolidated Gas Company, Boston, nominated by the American Gas Association

Quincy Bent, vice-president, Bethlehem Steel Company, Bethlehem, Pa., nominated by the American Society for Testing Materials

Dr. Lyman J. Briggs, Director, National Bureau of Standards, Washington, D. C., nominated by the U. S. Department of Commerce

Clayton R. Burt, president, Pratt and Whitney Company, Hartford, Conn., nominated by the National Machine Tool Builders' Association

Cloyd M. Chapman, Consulting Engineer, New York, *ex-officio* as past-chairman of Standards Council

L. A. Downs, president, Illinois Central System, Chicago, nominated by the Association of American Railroads

Bancroft Gherardi, vice-president, American Telephone & Telegraph Company, New York, *ex-officio* as past president

J. C. Irwin, Valuation Engineer, Boston & Albany Railroad, Boston, Mass., *ex-officio* as chairman of the Standards Council

F. E. Moskovics, chairman of the Board, Marmon Herrington Company, Indianapolis, nominated by the Society of Automotive Engineers

S. L. Nicholson, assistant to the vice-president and general manager, Westinghouse Electric & Manufacturing Company, New York, nominated by the National Electrical Manufacturing Company

J. Edgar Pew, vice-president, Sun Oil Company, Philadelphia, Pa., nominated by the American Petroleum Institute

U.S.S.R. Railways Adopt Standard Rail Design

Almost the first problem confronting the U.S.S.R railway authorities in carrying out the program of transport reorganization proposed by the second Five-Year Plan was the introduction of a rail suitable for axle loads up to 25 tons. After full consideration of practice in Europe and America, weighed in the light of Russian experience, an entirely new rail section was evolved, which, although weighing only 91.5 pounds a yard is now being used under 23-ton axle loads. This type has now been adopted definitely as the standard for Russian railroads.

The main points of difference between this rail and the types previously in use are the curved instead of straight contour of the web, and a straight incline of 1 in 4 on the top surface of the flange and also on the underside of the head, in place of two or three different tapers formerly used. The continuous slope of the top of the flange is of advantage from the point of view of rolling, and also metallurgically because of the equalization of the amount of metal in the head and flange of the rail. By adopting a section with a continuous slope, it was found possible to reduce slightly the thickness of the flange. As the slopes of the flange and the underside of the head are the same, the design of the fishplates is simplified.

The relation of the width of the flange to the height of the rail in the new standard section does not differ markedly from modern practice throughout the world.

Nash Motors Uses Standard Parts to Stabilize Production

A plan for stabilizing production, by scheduling the off-season manufacture of standard units, was tried out last winter at the Racine, Wisconsin, plant of Nash Motors, and was found to be a great success, according to a statement by E. H. McCarty, president, reported in *Automotive Industries*, May 18.

Mr. McCarty's plan is to build up a bank of parts for such units as axles and transmissions—comprising gears, shafts, etc., during the normally slack season. These parts involve machine shop operations which take time and require fine control. No assembly work is contemplated, since the assembly operations are comparatively simple and also because complete units would require too much storage space.

While the size of the bank of parts is subject to many considerations unique to each manufacturer, in the case of Nash, they will figure on a supply sufficient to take care of their needs for two or three months' production at the beginning of the season when the demand is usually most heavy.

The Nash management is so well pleased with the experiment at Racine that they expect to extend this activity to the Kenosha plants this winter.

Manufacturing Chemists Are New ASA Members

The Manufacturing Chemists Association of the United States has recently become an Associate Member of the American Standards Association.

This Association was founded in 1872 with the object of promoting the general and special interests of the chemical industry. Its membership is made up of manufacturers of chemicals whose principal plants are located in the United States.

New Zealand Credits Standards With Increasing Use of Electricity

Standardization of connecting parts of electrical equipment has been an important factor in bringing about an increasingly rapid rise in the use of electricity, a recent article in the New Zealands Standards Institution *Bulletin* points out.

Although lamps and wall sockets were fairly well standardized early in the history of electricity, the article says, cords and wall sockets for portable appliances have not been touched up to the present time in Great Britain and New Zealand. This has resulted in a state of confusion which makes necessary the use of a special cord for each piece of portable equipment.

Now a further step in standardization has been taken which will help to make cords and connections for electrical appliances interchangeable. The British Standards Institution has approved a British Standard Specification for connectors for use with portable appliances rated up to 1500 watts (or 7½ amperes).

In commenting on the approval of this specification, the *Bulletin* says:

There has been much talk during recent years of the provision of a cheap and abundant supply of electricity, and there are already signs that this is no mere idle phrase. Not only the industrial load, but also the domestic load is rapidly rising and "electricity in the home," even in the smallest dwellings, is no longer confined to lighting purposes.

Eliminate Non-Standard Sizes

We shudder to think what the rate of progress would have been, however, if there had been no standardization of lamps and holders. Wall plugs and sockets were standardized later than lampholders; in fact, not before several different sizes had already made their appearance, but in recent years there has been a marked improvement in the elimination of non-standard sizes, with the result that anybody wishing to buy a new plug can be sure that what he buys will fit the sockets installed in his house.

What is the situation, however, when he, or more often she, wishes to use different appliances from the same socket? The general rule seems to be that every appliance, such as a kettle, iron, vacuum cleaner, coffee percolater, hair drier, etc., requires its own length of flexible cord, with a plug at one end and a special connector at the other. This not only means that the cord must be carried about from room to room together with the appliance, but that several plugs, connectors, and lengths of cord have to be paid for where one set ought to be sufficient.

This state of affairs can now be simplified, however, because the connectors for use with portable appliances rated up to 1500 watts (or 7½ amperes) have been standardized for Great Britain, so as to secure interchangeability between all such appliances. This piece of standardization will undoubtedly prove of great convenience to users of small portable appliances.

This British Standard Specification, No. 562-1934, gives dimensions which mush be complied with to insure interchangeability, and a number of general features governing construction from the safety point of view.

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Automobile Association Becomes Member of ASA

The American Automobile Association has become an Associate Member of the American Standards Association. This is the largest organization of motor vehicle owners in the world, and has more than 750,000 members.

Organized in March, 1902, it has served the interests of the American automobile owners from the infancy of the industry. It is a federation of more than 800 local automobile clubs, uniting them into one national civic group.

Its efforts in securing reasonable and just legislation and its services in aiding proper enforcement of automobile laws and ordinances began soon after its organization. It has led in promoting travel by motor vehicles and has been effective in securing for motorists adequate highways throughout the country.

An important function of the A.A.A. has been to promote highway safety education among motorists and school children, and it has served to eliminate much of the earlier confusion in respect to state regulations through its efforts to propose uniform motor vehicle regulations.

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Industry Approves Simplification Of Forged Axes, Hammers, Hatchets

Simplified Practice Recommendations R158-35, Forged Axes, R159-35, Forged Hammers, and R160-35, Forged Hatchets, have been given the required degree of written approval by the industry and became effective July 1, according to an announcement by the Division of Simplified Practice, National Bureau of Standards.

Until printed copies are available, complimentary copies of this Simplified Practice Recommendation in mimeographed form may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

Office Standardization Brings Economies to Canadian Railroad

by
C. U. Stapleton

Manager, Office Services,
Canadian National Railways,
Montreal

TO do the volume of work necessary today and to do it quickly demands a large measure of standardization. Therefore, modern practice in office management includes standardization among its most important principles.

We found that a standardized method of investigating the necessity for "recording" should be set up. The compilation of records is sometimes continued for years after these records have outlived their usefulness. In some cases this waste has been due to the acceptance of long-established routines as essential, whereas often the question, "What would happen if this were discontinued?" discloses how unnecessary many of the motions have become.

In our own business we used this question with profit during the standardization of our printed forms. We first secured all possible information regarding printing processes, paper stock, and labor costs, and then we collected samples of all forms in use. After setting the minimum manufacturing standards to provide for our requirements, the forms were individually discussed with the using departments for the purpose of canceling those of no further use, effecting consolidations whenever possible, and setting up standard specifications for those subject to standardization.

Save One-Third of Cost

This approach, together with a forms committee control of new forms and revisions, has resulted in the original total of about 10,000 forms being reduced approximately 25 per cent. It was further found that a scientific approach to the problem of reducing the manufacturing cost of forms, a problem not commonly considered controllable by the purchaser, accomplished an average saving of more than one-third in the cost of about two-thirds of the forms now in use.

It has been our experience that the application of engineering principles in standardizing the production of our printed forms has enabled us to supply the least expensive materials suitable to the requirement, and has saved us many thousands of dollars yearly in printing bills.

The institution of a forms standardization program, accompanied by standard methods of cost control, and the extent to which it can be carried are, of course, largely dependent upon the number and consumption rate of printed forms in use. The importance of forms committee control in restricting the number of forms in use to the bare essentials should never be measured by the stationery saving alone, for this usually amounts to only a small fraction of the clerical saving.

Once the necessity is established, the next step in applying standardization is to find the simplest way of producing this work in the shortest time, with the least expensive tools and supplies, and to reduce the operation to a written standard.

When several large railways now forming the Canadian National Railway System were amalgamated, the attention of our management was directed to the need for uniformity in filing methods. We approached the task of bringing this

Standardization enabled Canadian National to reduce its 10,000 forms about 25 percent. "It was further found," writes Mr. Stapleton, "that scientific approach to the problem of reducing the manufacturing cost of forms, a problem not commonly considered controllable by the purchaser, accomplished an average saving of more than a third in the cost of two-thirds of the forms." He describes procedures and results in this article.

about with the belief that it would be a comparatively simple matter to survey the existing filing routines, select those best suited to universal use, and adopt them as our standards.

Standard Filing Systems

However, a preliminary survey made it apparent that the papers to be filed in one department were quite different in subject content from those of another and, as practically all filing in the transportation business is subject filing, due to the prevalence of inter-departmental correspondence, we soon perceived the necessity of setting up a separate standard filing system for each department. A universal system, embracing all the requirements of all departments, would be too cumbersome for departments requiring only a few of these subjects and would increase the hazard of duplications and incorrect filing.

One department with a large number of offices had five different systems in use in different parts of the country, and even where two of its offices had the same system, there was usually a considerable variation in its operation. As a result, the subject number assigned in one office was of little assistance in the receiving office. The transfer of staff and equipment between offices in the same department was also made difficult. In that department today filing is standardized, and some 800 offices are using a simple, uniform filing system, built up on the best principles of the former systems. Without departing from the principles embodied in this system, eight other systems were designed to suit the particular needs of other departments.

Standardized Equipment

Further standardization was found advisable in the office equipment procedure itself. The opinions of using offices had previously been considered sufficient justification for filling office equipment requisitions; now it became necessary to furnish facts for scrutiny before approval of the requisition could be obtained.

A further standardized procedure for periodic reports indicated current equipment needs. When changing conditions rendered certain equipment unnecessary, or permitted alternative arrangements, this equipment was turned in and used for future requisitions. This Standardized Office Equipment Control Procedure resulted in substantial savings in the handling of some fifteen hundred requisitions, reducing expenditures on this account by more than 10 per cent.

Office standardization may be summed up as a standardization of the product and of the production operations and the issuance of standard practice instructions.

Non-Standard Shoe Cartons Are Expensive for Industry

Shoe cartons are costing the British shoe industry £100,000 a year more than is necessary, according to *Newspaper World*, London, because carton makers are compelled to produce some hundreds of different sizes to suit the preferences of individual buyers. Thirty standard sizes, it is estimated, would meet the industry's requirements.

The Boot Manufacturers' Federation, with the National Association of Boot and Shoe Distributors (Wholesale), has been investigating the economic problems of the industry and calls attention to this situation in its report. The Federation recommends that individual firms adopt the standard sizes listed for future orders.

In addition to the cash savings in first cost of cartons and boxes, it is expected that the degree of uniformity resulting from this program will be of benefit to all sections of the industry.

Color, design, quality, and labeling are to be the subjects of future investigations.

Tire & Rim Association Published 1935 Year Book

The 1935 Year Book of the Tire & Rim Association, Inc., has been issued, bringing up to date the latest work in this field. The association is composed of representatives of tire manufacturers, rim makers, wire, wood, and disc wheel manufacturers, and allied parts concerns. K. D. Smith, B. F. Goodrich Company is president, C. L. Wenzel, Budd Wheel Company is vice president and H. W. Kranz, Cleveland Welding Company, is treasurer. S. P. Thatcher, United States Tire Company, Detroit, is chairman of the Standards Committee. C. E. Bonnett is secretary of the Association, which has headquarters in Cleveland. Copies of the Year Book are available from the ASA office.

Brick Industry Approves Revised Recommendation

Simplified Practice Recommendation R1-35, Vitrified Paving Brick, was given the required degree of acceptance by the industry and became effective June 15, according to an announcement by the Division of Simplified Practice, National Bureau of Standards.

Until ready in printed form, complimentary copies of this Recommendation, in mimeographed form, may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

Revised Water-Heater Standard Is Given Approval by ASA

A revised edition of the American Standard Approval Requirements for Gas Water Heaters, comprising extensive changes in the standard, has been approved by the American Standards Association.

The changes bring the standard up-to-date, providing specific requirements in cases where more general requirements had been given, and including methods of test in numerous instances where tests had not been given in the original standard.

The requirements represent minimum standards for performance, safe operation, and substantial and durable construction for gas water heaters of all types. They are designed to protect the public by making gas more safe and economical through the use of appliances which have been certified to comply with these minimum standards.

The American Gas Association is sponsor for the work of the Sectional Committee on Approval and Installation Requirements for Domestic Gas-Burning Appliances. Appliances which meet the requirements of the tests specified by the approved standards carried out by the American Gas Association are entitled to use the A.G.A. Seal of Approval to indicate compliance with the standards. Accessories for gas-burning appliances which meet the requirements of the A.G.A. tests according to approved standards are listed as complying with the standard.

Twenty-three standards for gas appliances and accessories have been approved by the American Standards Association as national standards.

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Weights & Measures Conference Names Dr. Briggs President

Dr. Lyman J. Briggs, Director, National Bureau of Standards, was chosen president of the National Conference on Weights and Measures at its twenty-fifth meeting, June 4-7.

The Conference, which is sponsored by the Federal Government through the National Bureau of Standards, is an organization composed primarily of State and local weights and measures officials. It is designed to protect consumer purchasing, as well as to effect commercial economy and efficiency, by development of codes comprising specifications and tolerances for weighing and measuring devices. It is also designed to promote uniformity in supervision of weights and measures throughout the United States. Supervision of weights and measures has not as yet been provided, or is inadequately maintained, in about one-quarter of the States.

ASA Library Compiles Hospital Equipment Standards

All existing standards on surgical instruments, hospital equipment, and supplies, and hospital laboratory apparatus were compiled recently by the American Standards Association Library at the request of the New York City Purchasing Department. The Department of Purchase expects to prepare specifications for surgical instruments as fast as such a highly technical standard can be worked out.

Other than certain German standards, and a few Federal specifications, the Library found that standards available in this field are surprisingly limited.

The Library of the American Standards Association has a file of over 20,000 publications on standardization available for loan or purchase. These include foreign and domestic standards and related publications.

Two bills now pending before Congress have to do with weights and measures, it was pointed out at the meeting. The Byrd bill is intended to consolidate Federal standard container legislation, and the Copeland bill to revise the Federal food and drugs act contains provisions having to do with weights and measures.

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Bill Would Provide Study Of Uniform Traffic Laws

A bill recently introduced in Congress would authorize the United States Bureau of Public Roads to make a study of traffic conditions, and measures for their improvement. Under the terms of the bill a report would be submitted to Congress, within three months of the measure's enactment, on the results of the study and research and on the status of uniform motor vehicle traffic laws throughout the country.

The Secretary of Agriculture, who would submit the report as head of the Federal department of which the Bureau of Public Roads is a part, would transmit it with recommendations, including suggestions for legislation which "will promote the necessary uniformity" in motor vehicle traffic laws.

Consumer Movement Seen By Marketing Specialist

"One of the most discussed topics of the day among marketing men is what might be termed the 'Consumer Movement,'" writes R. F. Elder in the *Technology Review*, February, 1935. "How large and how important it is we do not know. . . . It has the potentialities, if it is ever galvanized into action, of a major business force. Enterprises which depend on sales to consumers would do well to watch it carefully.

"It might turn into a vast movement for consumer education, to reincarnate in the American housewife the ability to judge merchandise and buy intelligently and frugally. . . . Or it might turn in the direction of seeking a greater degree of government control over marketing. It might, for instance, seek the standardization of consumer goods into definitely established grades, to make for greater ease in judging them."

Bureau of Standards Reports on Hosiery Tests

The brand, retail price, appearance, and construction of a stocking were found to be inadequate guides to its performance in tests conducted by the National Bureau of Standards recently. The tests measured the physical characteristics of the upper part of the leg of the stockings under repeated stretchings on the Bureau's hosiery-testing machine. Full-fashioned silk hosiery purchased from 14 retail stores located in eight large cities in different parts of the United States was tested.

A booklet, National Bureau of Standards Miscellaneous Publication M149, "A Basis for a Performance Specification for Women's Full-Fashioned Hosiery" by Herbert F. Schiefer and Richard S. Cleveland, describes the tests and their results, and presents the conclusions.

The booklet can now be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., or through the office of the American Standards Association, at five cents a copy.

Standard Time System Is Explained in Booklet

The rapid development of modern means of national and international communication has brought about a greater realization of the difference in time between different geographic centers. To answer the many demands for information on standard time, the National Bureau of Standards several years ago published a pamplet entitled "Standard Time Throughout the World," the latest revision of which has just been issued under the designation Circular C406. This circular gives a brief historical sketch of the development of the standard time system, time zone maps of the United States and of the World, a list of stations transmitting radio time signals, a list of the times used in several large cities, a list of the legal times used in most of the countries of the world, and other information regarding standard time.

Copies of this publication are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents each.

British Specifications Cover Asphalt Road Construction

British Standard Specifications have recently been published covering the whole field of asphalt road construction.

They represent the findings of a joint committee consisting of municipal and county engineers, technical and professional representatives of the Government Departments, and of societies and associations interested in the road problem. The deliberations, which have lasted three years, have been under the leadership of the Ministry of Transport.

The specifications control not only the proportion of materials used in road-making, but also their selection, so as to ensure the maximum degree of safety under all conditions of climate.

The specifications have been received by the American Standards Association, and may be borrowed or ordered through the ASA office.

Karl Meyer

Professor Karl Meyer, president of the national standardizing body of Denmark and president of the International Standards Association, died May 20. Dr. Meyer, who had a record of long and useful service in the standardization movement in his country, was a chemist by profession.

ASA Approves Standard Sizes of Jig Bushings

An American Standard for Jig Bushings, giving dimensions for press fit wearing bushings (headless and head types), renewable wearing bushings (slip and plain types), and liner bushings (headless and head types), was recently approved by the American Standards Association and has now been published.

The new standard gives tables for dimensions covering range of hole, body diameter, length, width of chamfer, head diameter, and head height. The hole sizes are in accordance with the proposed American Standard for Twist Drill Sizes.

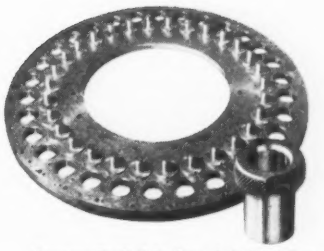
Cooperating with the technical committee on twist drill sizes in order to avoid any variation between the standard sizes of bushings and the sizes of drills, the technical committee which prepared the standard on jig bushings distributed drafts of its proposals to a wide list of interested individuals and firms for criticism and suggestions before submitting the standard for approval. The comments received were carefully considered by the technical committee before completing its work.

The technical committee which developed the standard for jig bushings and the technical committee on drill sizes are subcommittees of the Sectional Committee on Standardization of Small Tools and Machine Tool Elements. This sectional committee is sponsored jointly by the American Society of Mechanical Engineers, the Society of Automotive Engineers, and the National Machine Tool Builders Association.

F. S. Walters, Supervisor of Small Tools and Supplies, Westinghouse Electric & Manufacturing Company, East Pittsburgh, is chairman of the technical committee, and C. R. Alden, Chief Engineer, Ex-Cell-O Tool & Manufacturing Company, Detroit, is secretary.

Copies of the approved American Standard for Jig Bushings, B5.6-1935, are available from the sponsors or from the American Standards Association. The price is 35 cents a copy. Members of the American Standards Association are entitled to 20 per cent discount on all approved American Standards ordered through the ASA office.

The new American Standard covers liner and renewable wearing bushings, shown in this picture, as well as press fit wearing bushings.



Courtesy Ex-Cell-O Aircraft & Tool Corp.

Swedish Railroads Find Economies in Standards

The Swedish State Railways have been later than some in entering upon a standardization program, but this is explained by the fear that a premature standardization might be found to bring disadvantages later on and the desire to be quite certain of its suitability in every case before applying it.

In Swedish industrial circles, of course, a number of standard designs and specifications had been instituted, the mechanical and electrical engineering and metallurgical firms, in association with the Government, having established a Standards Institution in 1922. The adoption of most of these standards by the railways was found to accelerate work in the shops and proportionately reduce its cost.

In 1932 the management decided to appoint a committee to consider the standardization of rolling stock designs, a field appearing to offer considerable opportunity for effecting economies by this means. A series of drawings and specifications was accordingly prepared. One result has been to reduce the number of types of axlebox liner from 100 to 13. Standard open and closed type freight cars are to be adopted for new work. The former have been designed and 150 cars obtained. The details for the closed type, which will be suitable for running in fast trains, have not been settled as yet. A beginning has thus been made and in due course many other items will come under the committee's consideration, and a large sum will be saved by this policy.

British Standards Mandatory For New Zealand Aircraft

All material for aircraft plying in New Zealand, and subject to the approval of the Defence Department, must be in accordance with British Standard Specifications for Material for Aircraft. Lists and a complete set of specifications are available at the offices of the New Zealand Standards Institution, according to the N.Z.S.I. *Bulletin*, March.

Personal Safety Is Stressed In British Electrical Guide

In its tenth edition of the Regulations for the Electrical Equipment of Buildings, the Institute of Electrical Engineers (England) emphasizes safety to the individual. In the first edition, issued in 1882, the book stressed fire hazards, but danger from shock was mentioned only twice.

A.S.T.M. Elects 1935 Officers

H. S. Vassar, Laboratory Engineer, Public Service Electric and Gas Company, Irvington, N. J., was elected president of the American Society for Testing Materials at the annual meeting of the Society in Detroit, June 25.

A. E. White, Professor of Metallurgical Engineering and Director of the Department of Engineering Research, University of Michigan, Ann Arbor, Michigan, was elected vice-president of the Society.

Mr. Vassar is completing a term as vice-president of the A.S.T.M. and is active in the work of A.S.T.M. Committee D-9 on Electrical Insulating Materials, of which he was chairman from 1926 to 1930. He is also a member of A.S.T.M. Committee D-11 on Rubber Products

Mr. Vassar has been a member of the A.S.T.M. since 1915.

He is also interested in the work of the American Standards Association, representing the Electric Light and Power Group on the Sectional Committees on Standards and Specifications for Refrigerators, and on Electrical Insulating Materials in General.

Professor White was in charge of research on blast-furnace by-products, ores, etc., for the Jones & Laughlin Steel Company before he became instructor at the University of Michigan in 1911, and assistant professor in 1913. From 1917 to 1919 he was head of the metallurgical inspection division, Ordnance Department, of the U. S. Army. He has held his present positions since 1919. Professor White is active in the work of several A.S.T.M. committees in the metals fields, and is chairman of the steel committees group on materials for high-temperature service. He was the first president of the American Society for Metals and is past chairman of the research committee, American Society of Mechanical Engineers. Professor White is a member of the Sectional Committee on Standardization of Dimensions and Materials of Wrought-Iron and Wrought-Steel Pipe and Tubing under the procedure of the American Standards Association.

Members of the Executive Committee elected by the American Society for Testing Materials at its annual meeting are:

W. H. Graves, Chief Metallurgist, Packard Motor Car Company, Detroit, Michigan.

R. L. Hallett, National Lead Company, Brooklyn, N. Y.

N. L. Mochel, Metallurgical Engineer, Westinghouse Electric and Manufacturing Co., Philadelphia, Pa.

H. H. Morgan, Manager of Rail & Track Fastenings Dept., Robert W. Hunt Co., Chicago, Ill.

W. R. Webster, Chairman of the Board, Bridgeport Brass Co., Bridgeport, Conn.

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Pioneer in Standards Retires As Consolidated Gas President

George B. Cortelyou, a pioneer figure in the American standardization movement and chairman of the Advisory Committee of the American Standards Association, has retired as president of the Consolidated Gas Company after 26 years in that office. On July 1 he was succeeded by Frank W. Smith, who will continue as president of the New York Edison Company. Mr. Smith also has been active in the work of the ASA from its early days as the American Engineering Standards Committee.

Mr. Cortelyou's retirement follows the action of the board of directors setting the compulsory retirement age of employees at 70 years. He is three years beyond this age limit. Mr. Cortelyou served in President Theodore Roosevelt's cabinet as Postmaster General and later as Secretary of the Treasury.

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Requests Commercial Standard For Milk Strainer Filters

Johnson & Johnson, makers of surgical supplies, recently requested the National Bureau of Standards to cooperate in the establishment of a Commercial Standard for cotton filters for milk strainers. It is expected that the project will cover sizes, weights, straining qualities, bursting strength, sterilization, tolerances, marking, and labeling, the National Bureau of Standards announced.

ASA Asks Industry's Comments On Proposed Shrinkage Standard

The proposed standard specifications for designating shrinkage of woven cotton yard goods, unanimously recommended for adoption by American industry at a conference held recently under the auspices of the American Standards Association, are now being circulated to all interested organizations to determine whether they are acceptable for approval as American Standard.

The specifications define the terms used in describing woven cotton yard goods that have undergone a pre-shrinking process, and prescribe requirements for sampling, and for determination of shrinkage in accordance with what is termed the standard shrinkage test which is given in General Methods of Testing Woven Textile Fabrics (ASA 05-1934; A.S.T.M. D 39-34).

The standard also provides that, when fabrics are labeled indicating that a pre-shrinking process has been applied, the percentage of shrinkage still remaining in the fabric must be indicated on whatever marks or labels are used.

The proposed specifications apply to woven cotton yard goods, but do not apply to articles manufactured from the goods.

The request for specifications for shrinkage of woven cotton yard goods was submitted to the American Standards Association by the Textile Shrinkage Conference of the New York Board of Trade on November 1, 1933, following a resolution adopted by the Conference.

After informally contacting several interested organizations the American Standards Association organized a conference, to which 20 organizations particularly interested in shrinkage of cotton fabrics were invited.

Standard Test Method

In working out the proposed specifications a generally acceptable test method was required. Test methods had already been developed by the National Bureau of Standards, the American Society for Testing Materials, and the American Association of Textile Chemists and Colorists, each differing slightly from the others. In order to make the methods for determining shrinkage of woven cotton yard goods identical in the standard methods of the three organizations, a joint committee agreed upon a modification of the test method originally developed by the American Association of Textile Chemists and Colorists. The modified test method was incorporated by the American Society for Testing Materials into General Methods of Testing Woven Textile Fabrics, and was approved by the American Standards Association.

Subcommittee Prepared Draft

A subcommittee appointed to consider questions of limits and tolerances for grades of shrinkage, nomenclature, and allied matters prepared the draft standard which has been approved by the conference and is now being circulated to all interested organizations.

Upon receiving acceptances from a sufficient number of organizations to indicate that the standard is acceptable to the majority of groups concerned, the proposed standard will be submitted to the American Standards Association for approval.

Copies of the proposal are available from the American Standards Association office.

Subcommittee Clarified Shrinkage Proposals

The following representative subcommittee worked out the details of the proposed standard specifications for designating shrinkage of woven cotton goods, and its suggestions were approved by the general conference:

Wm. D. Appel, National Bureau of Standards
Oscar Berman, Union Made Garment Manufacturers Association
Robert S. Dempsey, Association of Cotton Textile Merchants of N. Y.
Ephraim Freedman, American Society for Testing Materials, American Association of Textile Chemists & Colorists, and National Retail Dry Goods Association
M. Leo Gitelson, Textile Fabrics Association
Frank A. Lester, National Association of Finishers of Textile Fabrics
Ruth O'Brien, U. S. Bureau of Home Economics and American Home Economics Association
H. B. Robbins, Laundryowners National Association of the U. S. and Canada
H. G. Zervas, National Association of Finishers of Textile Fabrics

Standard Units Merged With Aesthetics in British Plans

Cost is inevitably a governing factor in considering large-scale rehousing plans, and the economics of slum clearance hinge upon the policy adopted in regard to design.

Standardization of building parts, or the elements or units in construction, is the salvation of any such rehousing plan as is being developed in Great Britain. The Council for Research on Housing Construction believes that proper standardization will make possible the erection of tenement flats on an economic basis.

An almost infinite variety of elevations can be obtained by adaptation and variation of treatments, using standard units. Deadly uniformity is not inseparable from standardization. Only the uninformed can conclude that the critical aesthete and the trained engineer cannot both be satisfied with the results when standard units are artistically used. ***The Earl of Dudley, President, Council for Research on Housing Construction.***

Standardization Extends General Use of Materials

Both ordinary materials, and scientific developments evolved into practical shape for general application find their way most quickly into wide use through standardization. Examples of this fact surround us, from bricks to structural steel sections, bicycle tires, gas fittings or portable electric lamps, telegraph instruments, or wireless sets.

Essentials are standardized, details are controlled in the common interest, without restriction on general design, architecture or decorative taste. This aspect of standardization is the one that perhaps appeals most directly to the public eye.

But the basis of the whole work, which is necessarily a cooperative process, rests on the employment of a standardized nomenclature, standardized values and tests, and standards for raw materials.—*New Zealand Standards Institution Bulletin, March, 1935.*

Foreign Standards For Sale by ASA

Use serial number when ordering any of the foreign standards listed below. Address a postal card or letter, with name of person to receive the pamphlets, to:

American Standards Association,
29 West 39th Street,
New York.

Standards are printed in language of the country under which they are listed.

Great Britain

630. Road traffic control (electric) light signals.
631. Tractive armature direct-current neutral-polar line relays.
632. Two-coat asphalt (cold process).
633. Single-coat asphalt (cold process).
645. Fiber cores for wire ropes.
646. Grading for birch plywood.
647. Gross and net calorific value
648. Hot finished weldless steel boiler and superheater tubes for designed steam temperatures not exceeding 850 F.
649. Lapwelded steel boiler tubes for external pressure.
650. Lapwelded wrought-iron boiler tubes for external pressure.
651. Light aluminum alloy forgings for general engineering purposes (Duralumin).
652. Miners' headlamp bulbs.
653. Steel eyebolts with collars.
654. Steel spigot and socket pipes and specials for water, gas, and sewage.
655. Y-alloy forgings for general engineering puroposes (specific gravity not greater 2.85).

Holland

634. Definitions and specifications for roofing tiles.
635. Nomenclature for plugs (electrical).
636. Nomenclature of plugs and sockets (electrical).
637. Nomenclature for sockets (electrical).
638. Rivets with pan heads.
639. Rivets with snap heads.
640. Sieves for testing purposes.
641. Test specifications for fire fighting apparatus.

Germany

642. Basic data for computation of large bridges.
643. Heavy coupling nuts.
644. Waxed cloth hoods for typewriters.

Canada

656. Essential requirements and minimum standards covering electrical equipment:
Construction and test of electric portable lighting devices.
657. Construction and test of fractional horsepower motors.
658. Construction and test or service-entrance and branch circuit breakers.

Finland

659. Axle heights for machines.
660. Graphical symbols for electrical and magnetic quantities, nature of current, and connections.
661. Letter symbols for electrical and magnetic quantities.
662. Letter symbols for geometric and physical quantities.
663. Mathematical symbols.
644. Symbols for electrical units.

British Gas Industry Initiates Program for Standards, Research

Recommendations that the gas industry in Great Britain initiate a research and standardization program have led to the formation of the Gas Industry Committee of the British Standards Institution under the leadership of the Institution of Gas Engineers. This development has come about through the general recognition by British industry that Great Britain is exceptional among the larger gas-producing countries of the world in having no official and recognized system of test for ensuring the safety and efficiency of gas appliances.

It has been suggested that this program be organized with a wider scope than simply testing of appliances. An organization to cooperate on all problems having to do with the use of gas is planned. Four divisions have been proposed for such an organization, covering research, industrial, domestic, and illuminating problems, which would facilitate the distribution of technical information regarding domestic gas appliances and related problems.

In connection with the development of this program, the British gas industry has carefully studied programs which the American Gas Association has been carrying on in the United States for several years, and also programs that have been in operation in Europe.

One feature of the American program to which close attention is being given in Great Britain is the possibility of development of a "proving house," so-called, functioning somewhat after the manner of the testing laboratory of the American Gas Association, Cleveland, Ohio. One feature of the American program has been the granting by the American Gas Association to American manufacturers of the right to use the A.G.A. Seal on equipment and accessories that comply with recognized American Standards. A similar proposal in Great Britain in connection with the contemplated proving house, for granting the use of a label indicating that an appliance has been tested and approved, is under consideration by the gas and gas appliance industries.

Emily Newell Blair Urges Consumer Recognition

Mrs. Emily Newell Blair, former chairman of the Consumers' Advisory Board, now member of the Advisory Council of the new NRA, in a radio address June 18 urged consumer representation in all trade agreements and voluntary codes as an essential to fair treatment of all groups concerned with business.

Mrs. Blair pointed out that the Consumers' Advisory Board constituted the first governmental recognition of the consumer's stake in the organization and regulation of industry.

"With the scrapping of the codes," Mrs. Blair said, "the task given to the Consumers' Advisory Board ceases; namely, that of protecting the consumer in regard to codes. . . .

"As a result of the experience of this board, representatives of the consumer should be provided on every representative board regulating industry which may be set up anywhere, whether by law, as is suggested in the coal and petroleum bills, or by agreement of industry and labor as in the case of voluntary codes."

Australian Galvanized-Sheet Standard Is Now in ASA Office

The Australian Standard Specification for Zinc-Coated (Galvanized) Sheets (Plain and Corrugated) with which is published the Australian Standard Methods of Determining the Weight of Coating on Zinc-Coated (Galvanized) Articles is now in the American Standards Association office, and can be borrowed or purchased from the ASA Library.

STANDARDIZATION

Henry Ford defines standardization as:

"Standardization in its true sense is the union of all the best points of commodities with all the best points of production, to the end that the best commodity may be produced in sufficient quantity and at the least cost to the consumer."

G. M. Safety Award Goes to A. C. Plant

C. E. Wilson, right, vice-president of General Motors, congratulates Fred S. Kimmerling, general manager of the AC Spark Plug division, on the safety record of AC during April. American Standards Association safety codes are used in thousands of industrial plants throughout the United States.

Voluntary Retail Association To Protect British Consumers

With the avowed purpose of making it possible for the average customer to distinguish between the rival merits of goods offered for sale, and to give an accepted meaning to the language used in descriptions intended to guide the purchaser, a group of English retailers, including the proprietors of some of the largest retail establishments in England, have formed the Retail Trading Standards Association, according to a report from Frederic D. Grab, Acting Commercial Attache of the United States Embassy in London. They characterize it as a voluntary association of shop keepers pledged to certain published rules of "Straightforward Shopkeeping." It is open to all retailers, and all members will be entitled to display the Association's emblem, to invite public confidence, so long as they observe the standards of retail practice laid down by the Association. More than 600 shops have joined the Association.

The rules are essentially practical and are based on common sense. For example, "sale price" will mean a reduction from normal price; merchandise displayed in window will be identical with that sold in the shop; a piece of furniture described as antique will be at least 100 years old; the word "woolen" will be applied only to material made of wool.

To provide assurance that these standards will be observed, a Tribunal is being set up, owing responsibility only to the public, to which the public and members of the Association can appeal for redress against violations of the rules. A handbook describing the plan in full is available to the public, containing a summary of the standards of retail practice and other information. —*Domestic Commerce, May 30.*

British Approve Three New Building Standards

The Building Division of the British Standards Institution has completed and issued three new British Standard Specifications for Joinery Units, covering wooden gates, B.S.S. No. 583; wood mouldings, B.S.S. No. 584, and wooden stairs, B.S.S. No. 585.

The specifications for stairs and gates are of a general nature, providing requirements for quality of timber, dimensions of materials, and constructional details and finish.

The specification for wood mouldings includes, in addition, a series of British Standard suites of architraves, picture rails, dado rails, and skirtings so designed that, when assembled, they will be in harmony with one another.

Moisture content limits are provided in each of the specifications, the requirements having been based on tests of timber taken from actual manufacturing stock.

Charles Wood Stephen

Charles Wood Stephen, chief engineer of Reading, Pratt & Cady Company, Inc., who represented the American Society of Mechanical Engineers on ASA sectional committee B16, for Pipe Flanges and Fittings, died on May 2.

Mr. Stephen has been associated with the valve and fittings industry for a quarter of a century and for more than a decade has been active in the work of the Manufacturers Standardization Society of the Valve and Fittings Industry.

ASA Advances Tentative Standards On Piping to American Standard

A year ago nine standards and tentative standards for pipe and tubing of the American Society for Testing Materials were approved with the same status by the American Standards Association. In accordance with recommendations of the sectional committee for this project, B36, three of these specifications, which were advanced to the status of A.S.T.M. standard in 1934, have now been advanced by the American Standards Association from American Tentative Standard to American Standard.

In its early consideration of these specifications, the sectional committee recommended that the sponsors of the project take suitable steps to maintain the same status for the specifications in the A.S.T.M. and the ASA.

The specifications which have been advanced to American Standard are:

Specifications for Electric-Resistance-Welded Steel Pipe (B36.5-1935). This standard covers two grades of pipe up to and including 30 in. diameter for conveying liquids, gas, or vapors at temperature below 450 F and is adapted for flanging and bending in smaller sizes. The Code for Pressure Piping allows the use of this pipe in power piping systems of from 250 to 400 lb per sq in., and in gas and air piping systems, and district heating systems.

Specifications for Lock-Bar Steel Pipe (B36.7-1935). These specifications are for pipe suitable for liquids or gases. This pipe is made from steel plates rolled or formed into a circle, having longitudinal edges planed and upset to a dovetail form which engages in the grooves of an H-shape steel lock bar to form the longitudinal joint of the pipe. The Code for Pressure Piping allows its use in gas and air piping systems.

Specifications for Riveted Steel and Wrought-Iron Pipe (B36.8-1935) covers shop-fabricated straight pipe, suitable for conveying liquids or gases. It is made from steel or wrought-iron plates with riveted seams. The Code allows its use in power piping systems, gas and air piping systems, and district heating systems.

Bureau of Standards Tests Sound Through Floor, Walls

A description of the equipment and methods now used in making sound transmission measurements at the National Bureau of Standards is given in a paper published in the June issue of the *Journal of Research*, National Bureau of Standards.

To determine the transmission of sound through the test panel it is necessary to know the average sound pressure in the immediate vicinity of the panel. To make the sound pressure as uniform as possible a revolving loud speaker is used as a moving source, and the frequency is varied periodically through a certain range to give a "warble note" and hence a continuously shifting interference pattern. A thermo-element is used as an integrating device to give the average sound pressure. Measurements are taken at a number of points on each side of the panel at nine frequency-bands covering a range from 128 to 4,096 cycles per second.

The results of sound transmission measurements on a number of floor and wall panels are given. Results on the transmission of impact noises are also given for the floor panels, and the article includes a brief discussion of methods of reducing this type of noise.

Specifications for the construction of the test floor and wall panels, on which the measurements were made, are included.

Revise Simplified Practice on Glass Mayonnaise Containers

The revised Simplified Practice Recommendation on Glass Containers for Mayonnaise and Kindred Products, in which the four-ounce size container has been substituted for the three-ounce, is now available in printed form, according to an announcement from the Division of Simplified Practice, National Bureau of Standards.

The revised schedule became effective January 1, 1935, and is subject to regular revision by a standing committee of the industry.

Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for five cents each. Orders should include the symbol of the revised recommendation—R 131-35.

U. S. Bureau of Mines Publishes Review of Literature on Dusts

A circular recently issued by the Bureau of Mines comprises Part I of a comprehensive review of available literature on the effects of breathing dusts, with special reference to silicosis, largely in the mining and allied industries.

Parts II and III, to be issued later, will deal with prevention and treatment of dust diseases and some of the economic and legal aspects of dust diseases in industry, with special reference to mining.

The literature on this subject is so extensive that no attempt has been made to include all published material but only to assemble some of the more outstanding data on several aspects of the subject.

"Dust diseases are much before the public at present," says *Safety Engineering*, June, in commenting on the publication of the circular, "and there is good reason to believe that the information on the subject available to the layman is extremely meager. Even those rated as experts usually have a more or less theoretical conception of the diseases, their causation, remedies, and prevention, rather than actual experience with them.

"Until recently little attention was given to prevention and the usual attitude of the engineer, upon whom the main reliance for prevention ultimately must devolve, has been to let 'sleeping dogs lie,' or, more definitely, 'let well enough alone.' However, the 'laissez faire' attitude no longer is tenable, and in the past few years numerous conditions have caused those engaged in industry, including mining, to bring the subject before the public with a view to ascertaining the facts upon which to formulate remedial measures, primarily preventive."

ASA National Advisory Committee

The American Standards Association recently took an important forward step toward the establishment of safety standards which would help eliminate the hazards connected with dust in industry, when the ASA Standards Council authorized the appointment of a national advisory committee on toxic dusts and gases. One of the duties of the national committee will be to determine safe threshold limits of toxic dusts, gases, and fumes.

Copies of the Bureau of Mines Circular I.C. 6835 *Review of Literature on Effects of Breathing Dusts, With Special Reference to Silicosis*, by D. Harrington and S. J. Davenport, are available from D. Harrington, Chief, Health and Safety Branch, U. S. Bureau of Mines, Washington, D. C., or through the ASA office.

Standardization Would Reduce Cost Of Electricity, British Believe

Standardization of pressure and standardization of methods of charging for electricity in Great Britain would materially reduce the present 14 different pressures between 200 and 250 voltages, and the 1,014 different ways of charging, in the opinion of E. E. Hoadley, president of the National Electrical Convention, which was held June 3 at Bournemouth. Industrial supply and domestic development was the theme of the convention.

The electrical industry inaugurated at its first convention a program of progress, rationalization, and rehabilitation of the industry which it expects will affect every home and every factory in the country.

Many problems need to be settled if cheap electricity is to be given throughout the country. Some of these problems are technical, most of them financial, and a few of them political. Standardization is one of the most urgent problems, in the opinion of Mr. Hoadley.

British Standards Institution Issues Boiler Specifications

The second of the proposed series of British Standard Specifications for Boilers (B.S.I. 609-1935) has been issued by the British Standards Institution.

This specification deals with horizontal multitubular boilers of dryback and waste-heat types. It excludes setting, insulation, and furnace fittings, mechanical stokers, air preheaters, and similar auxiliary gear which are to be the subject of mutual agreement.

In the preparation of the specification representatives of the leading boiler insurance companies, marine classification societies, the Mercantile Marine Department of the Board of Trade, boiler makers, and users, collaborated.

British standards are available for loan or purchase through the office of the American Standards Association.

Standards of Quality Urged at Conference

Declaring that there had been a large and growing demand from consumer organizations for information as to quality standards for many products, Dr. A. S. McAllister, assistant director of the National Bureau of Standards, U. S. Department of Commerce, told the 25th National Conference on Weights and Measures, meeting in Washington on June 5, of progress in developing "the certification plan."

Numerous requests have been received from consumers, "both organized and unorganized, for data concerning trade-branded goods, tested at the National Bureau of Standards," he said, "the publication of which would be welcomed by many and opposed initially by few."

In response to this demand and in view of the limitations of the Bureau's activities, it has been determined that "the best method of giving the public the benefit of our tests and investigations is to place the results of our research at the disposal of committees formulating nationally-recognized specifications and to encourage firms to manufacture goods to comply with these specifications, and purchasers to buy specification-made goods."

The "certification plan" involves, it was explained, the compilation and distribution of lists of manufacturers desirous of obtaining contracts based upon certain selected nationally-recognized specifications, and "when requested to do so, to certify to the purchaser that the commodities delivered are guaranteed to comply with the requirements and tests of the specifications."

10,000 Firms Listed

The plan has been applied, thus far, to 460 federal specifications and commercial standards. There have been received more than 18,200 requests for listing from approximately 10,000 firms. Copies are now sent to all interested tax-supported agencies and are available to others upon specific request.

"The reception given to the certification plan by responsible manufacturers and representative trade associations has been very encouraging," Dr. McAllister told the Conference. "It is being utilized by 'public purchasers,' that is, purchasers for federal, state, and municipal governments who are spending the money collected from the public in the form of taxes. It is also being welcomed by other large purchasers, the purchases of which are of such magnitude as to justify the use of specifications.

"Many of the specifications to which the certification plan has been, or will be, applied cover commodities of much interest to over-the-counter buyers. Although it is not expected that such buyers will actually purchase commodities on individual specifications, some day they may be induced to confine their purchases of certain kinds of commodities to those known to be manufactured to comply with certain nationally-recognized specifications.

Educate Public

"They may even now be induced to examine critically such of these commodities as they do purchase to determine whether or not they are as represented and will comply with the buyer's individual requirements—to purchase on the basis of real quality and ability to meet service requirements rather than on the basis of superficial appearance or of the numerous kinds of sales arguments.

"For the purpose of bringing quality and service requirements of the merchandise to the attention of the over-the-counter buyer most effectively at the time of making purchases, use is being made of a self-identifying, quality-guaranteeing labeling plan which represents an important step in expanding the mass-production, mass-distribution, mass-consumption idea."

Dr. McAllister pointed out that experience in the use of such labels "and correspondence relating thereto indicate strongly that it is possible to educate the public to look for quality labels." —*Advertising Age, June 10.*

Manufacturers Ask Simplified Practice on Sweeps & Brushes

The Division of Simplified Practice of the National Bureau of Standards has been requested by the American Brush Manufacturers Association to cooperate in the establishment of Simplified Practice Recommendations for floor and garage sweeps, and counter, radiator, and window brushes, according to an announcement from the Division.

The American Brush Manufacturers Association commenced its simplification activity in 1926. Since that time the following Simplified Practice Recommendations have been promulgated and regularly revised:

R43-28, Paint and Varnish Brushes
R88-29, Floor Sweeps
R121-31, Block Sizes for Calcimine Brushes

China Establishes Weights and Measures Standards, Bringing Order Out of Chaos

by
Chenlott C. Wu[1]

Director, National Bureau of Standards, Republic of China

THE question of weights and measures has been considered a very important problem since the beginning of Chinese history.

The origin of standards dated back as early as 2700 B.C., when Huang-Ti, the founder of the Chinese Empire, established the so-called "five measures." The standard was quite as "scientific" as required, and it was convenient for public use. The distance between two knots of a certain cylinder of bamboo, when used as a whistle which produced a certain note, was chosen as the standard of length.

This bamboo cylinder was then split up into pieces and served as the linear measure, known as "musical scale." It was then divided, sometimes in nine and sometimes in ten parts, each part corresponding to "one old inch"; and each inch further divided into nine or ten divisions, each division approximating the breadth of a grain of rice.

The volume of such a block of hollow bamboo capable of containing 1200 grains was taken as the unit of capacity, 100 units of which made one "old liter." The weight of such a number of grains was taken as the unit of mass; 16 times this weight being taken as "old pound." As the origin of the standards comes from a musical conception, so comes the old proverb, "Same Origin: Music, Length, Capacity and Weights."

Changes in "Standards"

The origin of the standards of weights and measures seemed to be reasonable, but the grains themselves varied in their measures to a certain extent.

Changes of standard weights and measures occurred with the changes of dynasties. In the beginning of each dynasty, nothing was considered more important than the adoption of a new system of standards, as the old standards were either lost in civic struggles or condemned as unlucky.

Scholars would offer their proposals to the government for selection. When a certain standard was adopted, a new order would be issued for enforcement.

During the 40 centuries of Chinese history, about 30 changes were made officially in the matter of standard weights and measures. The variations in these changes ranged from 20.50 centimeters to 34.30 centimeters in length.

The last change made was in the beginning of the present century when the standards of length, capacity, and weights were defined and fixed by the value of the Metric System, making one Chinese foot equivalent to 32 centimeters, one Chinese liter equivalent to 1035.4688 cubic centimeters, one Chinese ounce equivalent to 37.301568 grams. This system was called the Builder Ruler and Silver Weight System.

Unification Began in 1912

As each dynasty set up a new standard and tried to put it into effect, no effort was made for real unification. The weights and measures used by the people were never in accordance with the official standards.

In 1912, when the Chinese Republic was established, a movement for the unification of weights and measures was started in the "Industrial and Commercial Convention." Adoption of the metric system as the only standard was proposed and passed. A ten year procedure was formulated. But the government did not accept this proposal, because the meter is too long and the kilogram is too heavy for customary usage.

In 1915 a law for weights and measures was promulgated with two systems:—one called system "A" being the old Builder Ruler and Silver Weight System, and the other system "B" being the International Metric System used parallel with it. Ten years passed, but no real result in unification was obtained. It was only partially adopted by the public in the old Capital of Peking and the province of Shangsi.

[1]Secretary, The Chinese Standards Committee, Nanking.

Since 1925, the Kumingtang movement of the late Dr. Sun Yat-Sen has widely spread the demand for the unification of weights and measures and it has attained its height in the Party propaganda. During the years 1926 and 1927 local governments tried the work of unification locally. Scientists and engineers were not shy in supporting proposals for proper standards.

Confusion Before Unification

The confusion caused by lack of uniformity in weights and measures cannot easily be believed. In China, weights and measures may vary in different businesses, vary in different localities, vary in different shops, or vary in different homes. The variations in the unit of length may cover a range from 19.97 to 63.80 centimeters, those in the units of weights from 350 gm to 868.5 gm, those in the unit of capacity from 476 cc to 1576 cc.

Not only foreigners become embarrassed, but even Chinese, in their business dealings, may be puzzled. This unhealthy state of affairs has no parallel except in the mediaeval ages; although certain trades always have their own standards their observance is not a matter of legality, only moral obligation.

Adoption of Present System

As soon as the National Government was established in 1927 in the New Capital of Nanking, the question of unification of weights and measures was taken up without delay. In 1928, with the establishment of the new Ministry of Industry, Commerce, and Labor, a decision was made for the adoption of a system which would on the one hand be in conformity with scientific and international usage, and on the other hand be convenient for use by the common mass of our population—one-fourth that of the whole world.

If we take one-third of a meter as the standard unit of length, this would be the average length of more than 100 varieties of "foot" used in different localities throughout the Republic. If we take one-half a kilogram as the unit of weights or mass, this would represent the average weights actually used by the common mass of the people; and if we take one liter as the unit of capacity, this would be the least factor for the very great variety of capacity measures, widely different in volume.

Thus, the International Metric System was set forth as the Standard System, while the system of 1/3 meter—1/2 kilogram—1 liter known as the 1-2-3 system, which is really a special scale of the metric system, was termed market system. The multiples and divisions of this 1-2-3 market system are exactly the same as the old system; although the values of the old system may vary greatly, their denominations are always the same. The denominations of the metric system, accordingly, were made to conform to the market system. A code for the new standards was promulgated July 3, 1928, by the National Government, and the new Weights and Measures Law was promulgated February 16, 1929.

Advantages of the New Standards

Because the new standard in the market system represents the average values of those lengths, capacities, and weights used commonly among

Need for Standards Cited by Official

The necessity of having a unified and universal Standard for Weights and Measures in China is not only a desperate need of our own people, but also is felt urgently by foreign residents as well. It is believed that the new standard should both be fit for the general use of the great public and comply with recognized international practice.

The problem was solved in 1928 by establishing the simplest ratio between the mean values of the various scales used in different localities throughout the Republic of China and the International Metric System—that is, taking 1/3 of a meter as the New Market Standard for the unit of length, ½ of a Kilogram for the unit of weight, 1 liter for the unit of capacity, known as Market or 1-2-3 Conversion System.

In order to meet the needs of the foreign officers, engineers, importers, shopkeepers, and students, a general survey on the present status of unification in one of the foreign languages seems to be necessary. The present Bulletin with historical treatment on the choice of the New Standards, translations of general regulations for enforcement, and numerous conversion tables may meet the requirements.—*His Excellency, Kung P. Chen, Minister of Industries, Republic of China.*

Romance Is Seen in China's Struggle for Standards

"An interesting indication of the spread of the standardization movement is found in the recent establishment of a Commercial and Industrial Standards Committee under the Bureau of Standard Weights and Measures of the Chinese Ministry of Industries. China is not regarded as being in the forefront of the industrial nations, yet she can lay claim to what is almost certainly the earliest record of organized national standardization, since it dates back to 2700 B.C.

"The remarkable antiquity of these standards, the vicissitudes through which they passed with changing dynasties and civil strife, the almost hopeless confusion which resulted from numerous changes of the units, the struggle during recent years to reduce this chaos to order, and the ultimate establishment of a modern system of units related to those of occidental countries give to the historical narrative an air of romance not usually associated with the standardization movement."—*Fifth Annual Report, Standards Association of Australia.*

the people for thousands of years throughout the Republic, there will be no objection in any part of the country or any section of the people to their adoption. All the constants and formulae in science and engineering expressed in the metric system can be easily transformed into the market system for application, and those expressed in the market system can also be easily transformed into the metric system when necessary.

The idea of taking one-third of a meter as one "Chinese Foot," may be considered as derived from the relation between yard and foot in the English-American System; that of taking one-half of a kilogram as one "Chinese Pound" is the same as the so-called "Metric Pound." The volume of a liter is not far from a quart.

So the usage of "Shih Chih," "Shih Chin," and "Shih Sheng" may be compared with the foot-pound-quart system. The 1-2-3 relation of the standard metric system to the market system can also be applied to the English-American usage. It is interesting to note that The Decimal Association of England has already passed a new scheme based upon this principle for metric reform.

The Law and the Regulations governing the standardization of weights and measures came into effect January 1, 1930. The government organizations and public institutions were expected to take the lead for the adoption of the new systems. In view of the different economic stages and development of communication now prevailing in the different provinces and municipalities, enforcement of the law was begun at three different periods. Along the Yangtze and the sea coast, with 17 provinces and 8 special municipalities, enforcement began before the end of 1931; in the interior provinces before the end of 1932; in the border territories before the end of 1933.

Administrative and Technical Procedure

For the effective administration of the law governing the standardization of weights and measures, the National Government has authorized the Ministry to establish a National Bureau of Standard Weights and Measures with three divisions:

1. The Division for Enforcement.
2. The Division for Calibration.
3. The Division for Production.

Besides, there are in the Bureau:

1. The institute for the training of weights and measures inspectors.
2. The factory for the manufacture of standard weight and measure instruments.

In the case of Provincial Governments and special municipalities, local bureaus for the calibration of weights and measures are established by the Provincial Department of Reconstruction of Industries and the Bureau of Social Affairs, respectively. Each district will have its branch office for the calibration of weights and measures.

Manufacture of Standards

The standard instruments consist of three kinds. The primary standards are made of Platinum-Iridium, the secondary of Nickel-Steel, and the third of brass. One set of Pt-Ir standards, and one set of Nickel-Steel standards made by the Bureau International des Poids and Measures, were taken as the prototype for the manufacture of Brass Standards to be distributed to all the districts throughout the Republic.

At present, more than 2,000 of these standard measures have been distributed and certificates are issued for each set.

The government is not trying to monopolize the manufacture of these new measures for the public. Only specimens made according to the new standard and the new method are manufac-

tured for distribution, and all of them are carefully calibrated.

All the measures made either by the government or by the private factories must be calibrated and marked or stamped with proper seals by the official inspectors. No instrument without the mark of "Universal" (with Chinese Character of abbreviation) shall be offered to the public. Each province or special municipality shall have its special mark in addition to the "Universal" mark.

Present Status of Unification

There are about 100 first-class technical inspectors, 300 second-class inspectors, and 900 third-class inspectors trained for service. At present, local bureaus and branch offices have been established in most of the provinces and municipalities except Szechuan, Sekong, Sinkiang, Tsinghai, and Shuyuan provinces. In railways, posts, road construction, and land surveying, the new system has already been widely adopted.

In Chekiang, Shantung, and the municipalities of Nanking and Shanghai, adoption by the public is widespread. Hopei, Kiangsu, and the municipalities of Peiping, Tsingtso come next in popular adoption of the standard. Fukien, Ningshia, Honan, Hupei, Shensi, Kiansi, and the municipalities of Tientsin, and Hankow come third in the order of adoption, while Kwangtung, Kwangsi, Yunnan, Kweichow come in the fourth order. This was the status at the beginning of 1933. It can be estimated from the number of registered work shops for the manufacture of weights and measuring instruments, and their production capacity, with the rate of supply of new instruments, how long it will take to obtain complete unification.

As the work of enforcement and inspection was only started in the year 1930, the result during the last three years is rather satisfactory. It is hoped that at the end of this year, the new instruments can be generally spread throughout the realm. So the confusion arising from the differences in weights and measures, affecting the livelihood of the people, can be cleared away.

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American Transit Association Issues Its Engineering Standards

All of the standards of the American Transit Engineering Association, revised to December 31, 1934, covering power, purchases and stores, rolling stock, and way and structures, have been published in one volume. Standards and specifications for miscellaneous methods and practices (including "Signaling Division") are published separately.

One hundred eighty-one standards, of which all but 16 are included in the large volume, are listed as American Transit Engineering Association standards.

The two books are available from the American Transit Association, 292 Madison Avenue, New York, or through the Library of the American Standards Association.

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Foot Measure Has Been Changing Unit in China

Historical Varieties of Linear Measures in the Past 40 Centuries in China

(Equivalent of "Chih" in Centimeters)

Hsia Dynasty	B.C.	2205	25.92
Shang Dynasty		1766	23.33
Chow Dynasty		1122	20.74—18.66
Han Dynasty		201	28.28
Eastern Han Dynasty	A.D.	81	23.60
" " "		200	28.39—25.08
Wei Dynasty		220	21.72
Western Tsin Dynasty		280	27.28—20.70
Eastern Tsin Dynasty		317	27.28—22.07
Six Dynasties		420	24.30—22.14
Northern Chow Dynasty		557	26.52—24.30
Sui Dynasty		589	25.43—23.30
Tang Dynasty		620	36.00—31.10—28.80
Sung Dynasty		960	34.29
Yuan Dynasty		1279	31.75—29.16
Ming Dynasty		1368	31.91—29.16
" "		1600	31.96
Tsing Dynasty		1882	30.75
" "		1908	32.0
Peking Government		1915	32.0
National Government		1928	1/3 Meter (Standardized)

Standardized Construction Used in Low-Cost Apartment

Standardization in the planning of flats is the chief feature of the R. E. Sassoon House, a five-story block of 20 low-rental flats at Peckham, England, which was opened recently by Sir Samuel Hoare.

The building is of reinforced concrete construction, and the walls are lined internally with compressed cork. Each flat has a large balcony to accommodate at least two children's beds.

The kitchen is a standardized unit, and this principle is adopted throughout the scheme, with a consequent standardization of all other rooms.

British Keep Tests for Petroleum In Accord With A.S.T.M. Methods

In order that methods of testing petroleum and its products may be internationally uniform as far as possible, the tests given in the revised edition of *Standard Methods for Testing Petroleum and Its Products*, just published by the Institution of Petroleum Technologists, London, are in accord with those standardized by the American Society for Testing Materials, wherever possible, the Institution reports. In those cases where complete agreement has not been possible on account of necessary modification to meet British practice, this has been indicated by the addition of the word "modified" to the A.S.T.M. Serial designation in this edition. In most instances, the modification is only slight and not likely to affect the comparison of results by both methods.

Consider New Tests

Since the publication of the second edition of *Standard Methods for Testing Petroleum and Its Products* in 1929, the committees responsible for the work of investigating the methods have been active in the consideration of new methods and in the revision of methods previously standardized.

In the past it has been the policy of the committee to specify "standard" methods only. During the last two or three years, however, there have been requests for special tests which would be useful but which require further experience in their application and further investigation into details. A special section which presents such tests as "tentative" methods has been included. It is hoped in this way to obtain information regarding the use and application of these tentative methods in practice. Included in this section are methods of test for gum in motor fuels, knock-rating of motor and aviation fuels, and a multiple cup bath for the redwood viscometer.

Notable Additions

The number of standard methods has been increased considerably. Notable additions are the tests for greases (ash, consistency, drop point, free alkali, and free acid), an aniline point test for kerosene, gas oil, and fuel oil, the reintroduction of the pour point test in addition to seething point, dilution of crankcase oil, a distillation test for cut-back bitumen and road oils, tetra-ethyl lead in gasoline, vapor pressure by the Reid method, and viscosity in kinematic units.

It has also been found necessary in some cases to make revisions to the existing methods, one particular case being Redwood viscosity where it was found that the technique of the test could be improved in detail.

In the first and second editions of the book, the tests were arranged in classifications according to the particular product to which they applied. It was found that this led to some inconvenience in the use of the book as it necessitated considerable cross referencing and the consequent trouble of having to refer to several parts of the book to obtain full details of the technique for a particular test. In the present edition the more logical method of arranging the tests in alphabetical order has been adopted.

Standard Methods for Testing Petroleum and Its Products, third edition, published by the Institution of Petroleum Technologists, Aldine House, Bedford Street, London, can be borrowed or ordered through the office of the American Standards Association.

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Standards for Signal Glasses Set by Railroad Association

The Association of American Railroads (Signal Section) has perfected specifications defining the colors and degree of luminosity of signal glasses used in railroad signaling. Red, yellow, green, blue, purple, and lunar-white colors are included.

The values given in the specifications were derived from spectrophotometric data obtained by the Colorimetry Section, National Bureau of Standards, upon glasses selected by Committee VI of the Signal Section to represent the desired colors.

Any color can, in general, be adequately specified in terms of three colorimetric quantities. In the case of the signal colors the three quantities adequate for the purpose are two numbers defining the chromaticity of the color (i.e., its hue and saturation) and one number defining the luminous transmission of the glass.

Standard limit glasses calibrated by the National Bureau of Standards have been provided for in the specifications, and proper methods of using them are given.

Large Savings Reward Use of Standardization

Standardization of the parts one buys or uses is not something to consider once and forget as having been attended to. Developments in new materials, more universal acceptance of standardization, keep it forever a live subject. There is, furthermore, a natural tendency for the sizes and styles of materials used to multiply unnecessarily.

That benefits reward consideration of simplification of materials and parts is undoubted, but almost always they are surprising in their amount. The reduction in parts and saving in cost made by one manufacturing company are shown in the table.

Frequently, by taking advantage of new materials, simplification follows. One company used 134 wood handles, requiring 55 drawings. Many handles split during assembly of the parts. A family of molded composition handles were developed, which were cheaper, but enabled the company to reduce the total sizes necessary to three. One company found itself using 1,329 sizes of washers. By deciding that for any given bolt or screw size a standard, wide, or extra-wide washer would always do, 1,179 of those kinds were eliminated.

In general, the benefits of reduction of parts are several: greater interchangeability is provided, fewer tools for assembly are needed, parts can be bought more cheaply, and storage space, bookkeeping, and inventory costs are reduced.—*The Electric Journal, June.*

Subject	*Original Number*	*Present Number*	*Approximate Savings per Year*
Steel tubing	35	22	$ 700
Brass tubing	206	61	5,700
Copper tubing	78	21	2,500
Slate bases	336	73	12,000
Soapstone	150	0	6,750
Cable	350	195	7,600
Oil rings	72	44	7,200
	1,227	416	$42,450

Typical Economies of Standardization

Publish Specifications Used For Government Purchasing

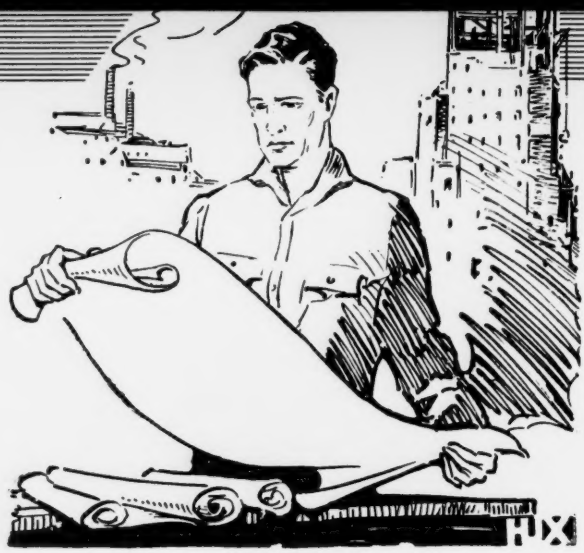
Federal specifications now being used for Government purchases have been received by the American Standards Association Library. Copies can be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., or through the ASA office at five cents each. Members of the American Standards Association may borrow copies through the ASA Library.

The most recent specifications are:

Woodworkers' augers, bits (auger and wood-boring), and chisels (mortising, hollow) GGG-A-801
Cardboard laundry boxes UU-B-651
Motorless dental operating chairs AA-C-326
Glass lamp and lantern chimneys and globes DD-C-311
Wire screen cloth RR-C-451a
Zinc-coated iron or steel culverts QQ-C-806
Fresh eggplant HHH-E-236
Steel sectional office furniture and cabinets AA-F-791a
Locomotive tender corrugated hose ZZ-H-581
Cotton flannel CCC-F-456
Fresh mustard and turnip greens HHH-G-651
Aluminum-alloy ingots QQ-A-371
Large tungsten-filament incandescent electric lamps W-L-101b
Basic-carbonate, dry, paste-in-oil, white lead TT-W-251a
Fresh lettuce HHH-L-226
Diesel-engine lubricating oil VV-O-511
Manifold paper UU-P-328a
Waterproof sheathing paper UU-P-536
Fresh peas HHH-P-156
Molded cork pipe-covering HH-P-381
Receptacles (convenience outlets); attachment plugs, current taps, and connectors W-R-151
Machine screws (including set screws) FF-S-91
Steel storage shelving AA-S-271
Silver solder QQ-S-561a
Fresh spinach HHH-S-616
Silver-plated tableware RR-T-51a
Cotton thread V-T-276a
Asphalt tile SS-T-306
Structural clay floor tile SS-T-321
Structural clay load-bearing wall tile SS-T-341
Structural clay non-load-bearing tile SS-T-351
Fresh tomatoes HHH-T-576
Rubber tubular tourniquets ZZ-T-606
Brass or bronze, low-pressure, 100-square-foot size (for land use) thermostatic radiator traps WW-T-696
Gasoline or Diesel engine motor trucks KKK-T-706
Electrical metallic tubing WW-T-806a
Steel wool FF-W-556

Consumer Psychology Changed, Mrs. Blair Tells Advertisers

"Tastes have given away to needs, vanity and pride to use-value. The gas-per-mile car is more important than a streamline. The shrinkage of a dress counts more than the latest style. The amount of peaches in a can counts more than the size of the peach, the quality of a cold cream in a jar more than a delicate aroma—and price above all."
—Mrs. Emily Newell Blair, formerly chairman, Consumers Advisory Board, NRA, now member of Advisory Council, before the Advertising Federation of America, Chicago, June 12.



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